Bronchial Asthma

Check your background

- What is bronchial asthma ?
- How many people near to you have asthma ?
- What do you know about the role of inhalers in asthma treatment ?

What is Asthma…..Definition (GINA)

- Asthma is – A **chronic inflammatory disorder** of the airways in which many cells and cellular elements play a role.

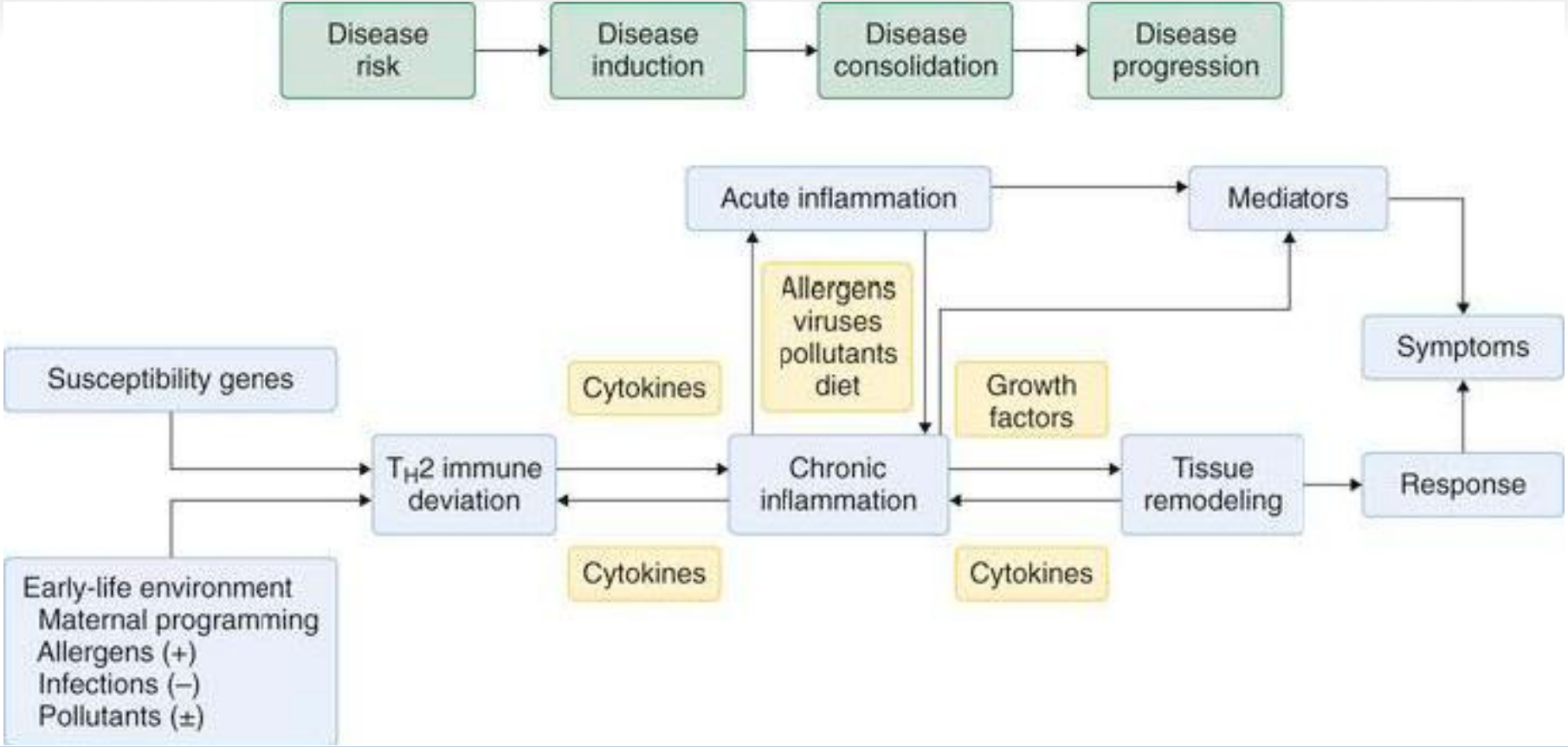
- The chronic inflammation is associated with **airway hyper-responsiveness** that leads to **recurrent episodes of wheezing , breathlessness, chest tightness** and coughing particularly at night or early morning.

- These episodes are usually associated with widespread, but **variable airflow obstruction** within the lung that is **often reversible** either spontaneously or with treatment

Epidemiology

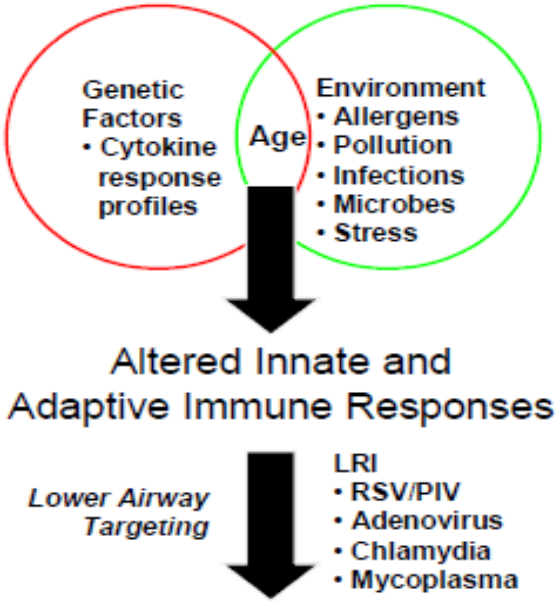
- The prevalence of asthma increased steadily over the latter part of the last century.
- Current estimates suggest that asthma affects 300 million people worldwide, with a predicted additional 100 million people affected by 2025.
- In yemen ,in children aged 13-14 ,prevalence was 14.4

Pathophysiology



Pathophysiology

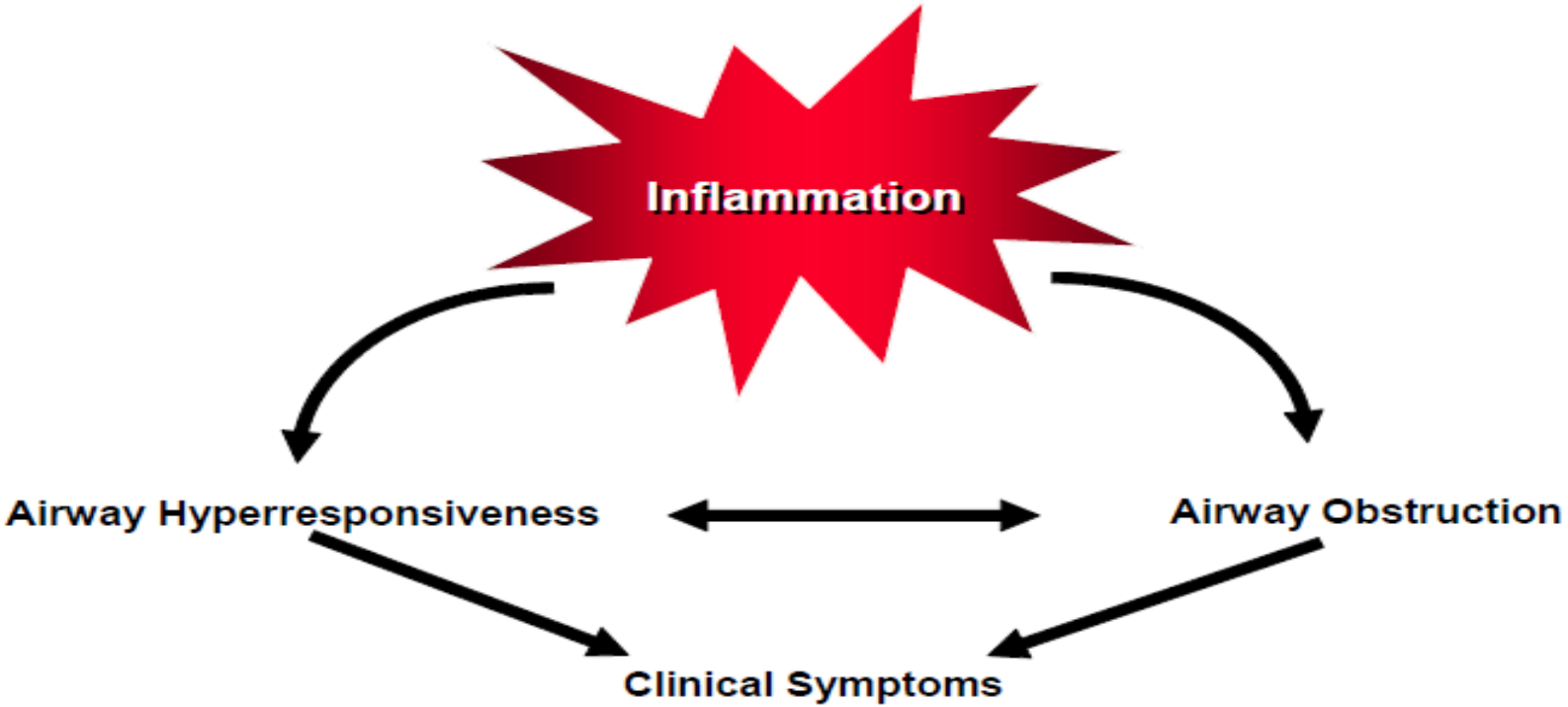
FIGURE 2–4. HOST FACTORS AND ENVIRONMENTAL EXPOSURES



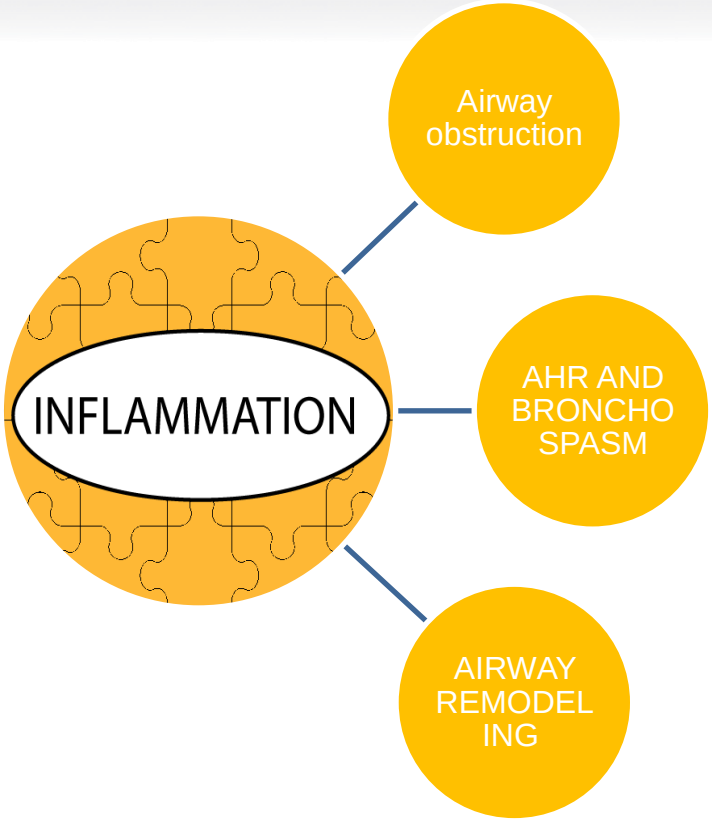
Key: LRI, lower respiratory illnesses; RSV, respiratory syncytial virus; PIV, parainfluenza virus

Pathophysiology

FIGURE 2–1. THE INTERPLAY AND INTERACTION BETWEEN AIRWAY INFLAMMATION AND THE CLINICAL SYMPTOMS AND PATHOPHYSIOLOGY OF ASTHMA



Pathophysiology



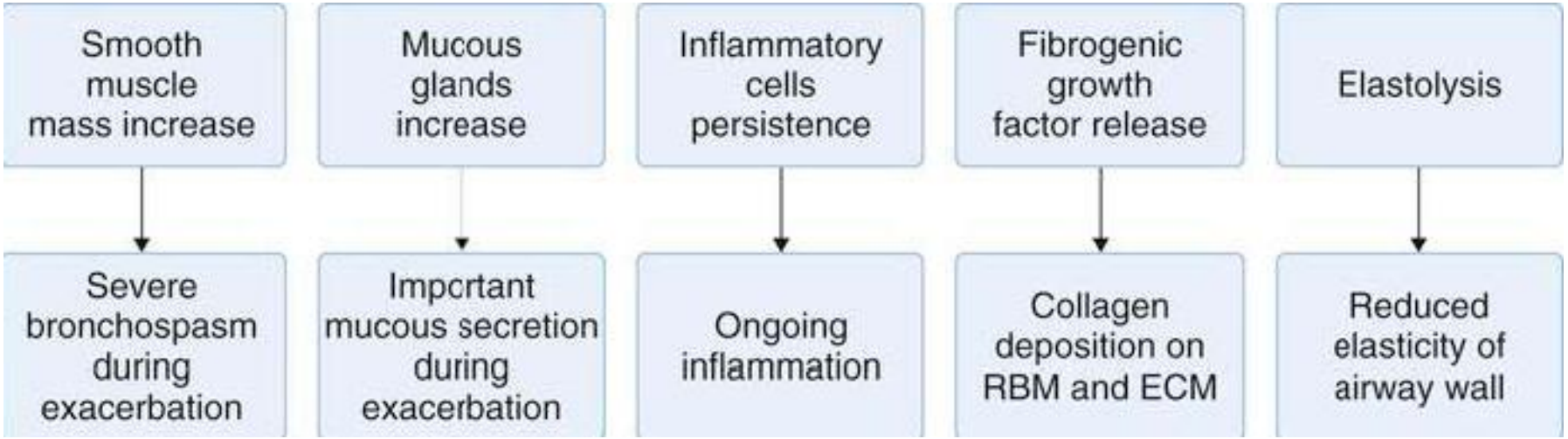
Pathophysiology

- Airflow Limitation
  - Induced by airway inflammation
  - Bronchoconstriction-Bronchial smooth muscle contraction that quickly narrows the airways in response to exposure to a variety of stimuli
  - Airway hyperresponsiveness-and exaggerated bronchoconstrictor response to stimuli
  - Airway edema-as the disease becomes more persistent and inflammation become more progressive, edema, mucus hyper secretion, and formation of inspissated mucus plugs further limit airflow.

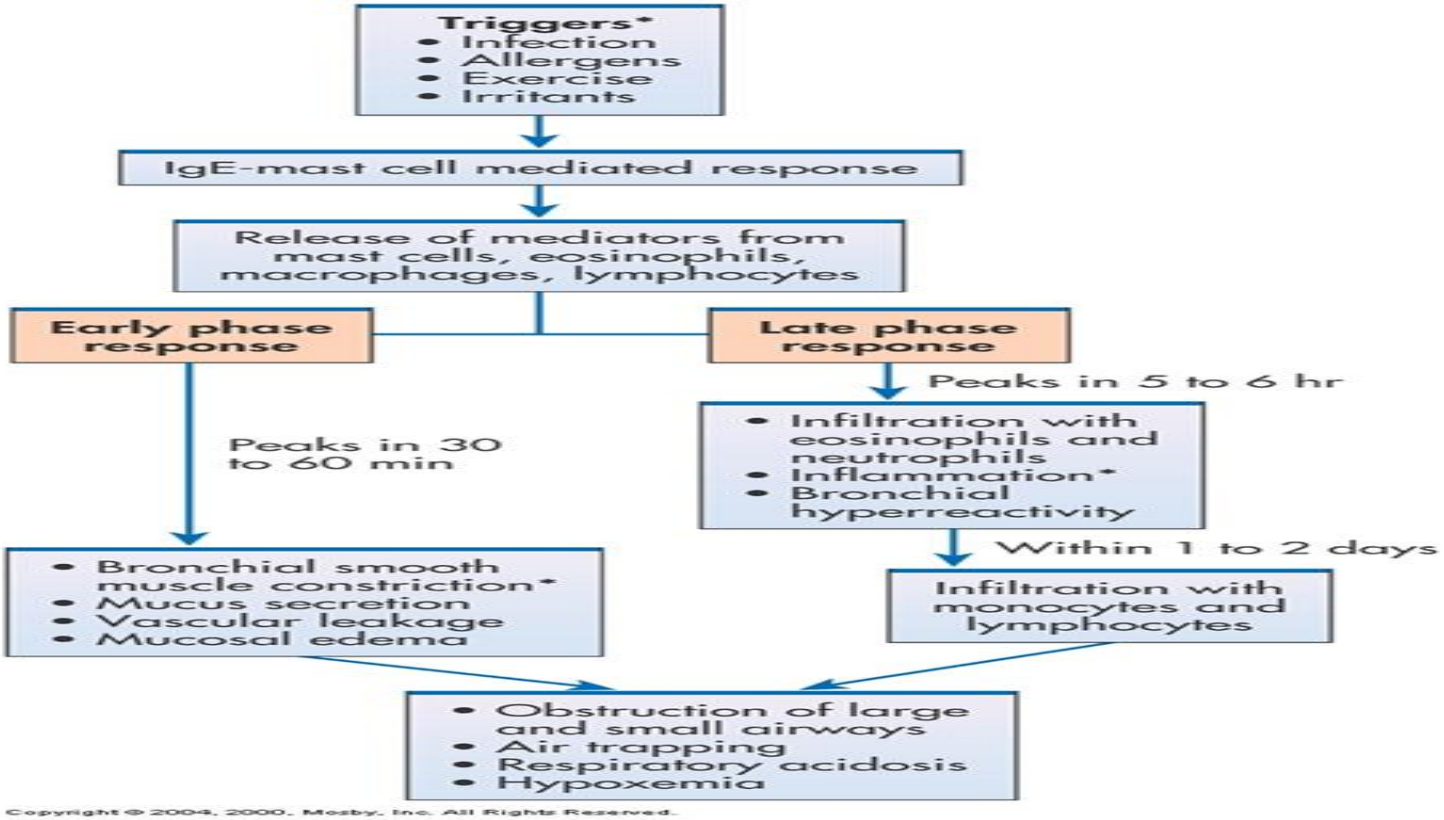
Pathophysiology

- Remodeling
- Reversibility of airflow limitation may be incomplete in some patients.
- Persistent changes in airway structure
  - Sub-basement fibrosis
  - Mucus hypersecretion
  - Injury to epithelial cells
  - Smooth muscle hypertrophy
  - Angiogenesis

Consequences



Early and Late Phases of Responses of Asthma



Asthma response

Early-Phase Response

- Peaks 30-60 minutes post exposure, subsides 30-90 minutes later
- Characterized primarily by bronchospasm
- Increased mucous secretion, edema formation, and increased amounts of tenacious sputum
- Patient experiences wheezing, cough, chest tightness, and dyspnea

Asthma response

Late-Phase Response

- Characterized primarily by inflammation
- Histamine and other mediators set up a self-sustaining cycle increasing airway reactivity causing hyperresponsiveness to allergens and other stimuli
- Increased airway resistance leads to air trapping in alveoli and hyperinflation of the lungs
- If airway inflammation is not treated or does not resolve, may lead to irreversible lung damage

Clinical Manifestations

- **Unpredictable and variable**

Clinical Manifestations

History

- Typical symptoms include recurrent episodes of wheezing, chest tightness, breathlessness and cough

particularly if:

-- symptoms are worse at night and in the early morning

-- symptoms are present in response to exercise, allergen exposure and cold air

-- symptoms are present after taking aspirin or beta blockers

Supportive history of :

- History of atopic disorder
- Family history of asthma and/or atopic disorder

Clinical Manifestations

Examination

- Expiration may be prolonged from a inspiration-expiration ratio of 1:2 to 1:3 or 1:4
- Polyphonic wheeze,
- Signs other diseases mimicking asthma
- However, the examination can be normal
- Wheezing is an unreliable sign to gauge severity of attack
- Severe attacks can have no audible wheezing due to reduction in airflow
- “Silent chest” is ominous sign of impending respiratory failure

Clinical Manifestations

- Examination of the patient during an acute attack usually reveals signs of hypoxemia
- Restlessness
- Increased anxiety
- Inappropriate behavior
- Increased pulse and blood pressure
- Pulsus paradoxus (drop in systolic BP during inspiratory cycle >10

Clinical Heterogeneity of Asthma

- Allergic versus nonallergic asthma
- Late-versus early-onset asthma
- Exercise-induced asthma
- Nocturnal asthma
- Asthma with prominent symptom of cough (cough variant asthma)

Diagnostic Studies

- The diagnosis of asthma is predominantly clinical and based on a characteristic history
- Investigations are used to provide supportive evidence particularly in intermediate and low probability
- Investigations include

- A full blood picture may show the peripheral blood eosinophilia.
- *Radiological examination*: chest X-ray appearances are often normal or show hyperinflation of lung fields
- ABGs in severe cases and exacerbations
- IGE level is not necessary in initial evaluation of asthma

Diagnostic Studies

- Demonstration of variable airflow obstruction
- Lung function tests
- *Spirometry*
- This identifies the obstructive defect, defines its severity, and provides a baseline for bronchodilator reversibility.
- (FEV1/FVC)ratio of less than 70% (or below the

lower limit of normal if this value is available) as a positive test.

- *Bronchodilator reversibility* FEV1 ≥ 12%* (and 200 mL) increase following administration of a bronchodilator/trial of corticosteroids regard as a a positive test.

Diagnostic Studies

- *Peak expiratory flow variability*

> 20% diurnal variation on ≥ 3 days in a week for 2 weeks

on PEF diary regard as positive

- It is not uncommon for patients whose symptoms are suggestive of asthma to have normal lung function

- exercise challenge test

FEV1 ≥ 15% decrease after 6 mins of exercise regarded as positive

- Airway inflammation measures
- *Fractional exhaled nitric oxide*

Regard a FeNO level of 40 parts per billion (ppb) or more as a positive test

Diagnostic Studies

- Airway hypereactivity measures
- *Direct bronchial challenge test with histamine or methacholine*

_ Regard a PC20 value of 8 mg/ml or less as a positive test.

_AHR is sensitive but non-specific: it has a high negative predictive value but positive results may be seen in other conditions, such as COPD, bronchiectasis and cystic fibrosis.

Other investigations

- *Measurement of allergic status*

Skin prick test to demonstrate presence of atopy ,and in refractory cases

- *Assessment of eosinophilic airway inflammation*:

An induced sputum differential eosinophil count of greater than 2%

Diagnosis

- Diagnosis of bronchial asthma is a clinical one
- No single test prove the diagnosis of asthma
- Tests influence the probability of asthma but don’t prove a diagnosis
- no consistent gold standard diagnostic criteria for asthma
- PRACTICAL APPROACH TO DIAGNOSIS
- The diagnosis of asthma in children and adults is based on the recognition of a characteristic pattern of respiratory symptoms, signs and test results and the absence of any alternative explanation for these.

Diagnosis

- Features that increase the probability of asthma

- More than one of the following symptoms: wheeze, breathlessness, chest tightness and cough, particularly if:

-- symptoms are worse at night and in the early morning

-- symptoms are present in response to exercise, allergen exposure and cold air

-- symptoms are present after taking aspirin or beta blockers

- History of atopic disorder
- Family history of asthma and/or atopic disorder
- Widespread wheeze heard on auscultation of the chest
- Otherwise unexplained low FEV1 or PEF (historical or serial readings)
- Otherwise unexplained peripheral blood eosinophilia

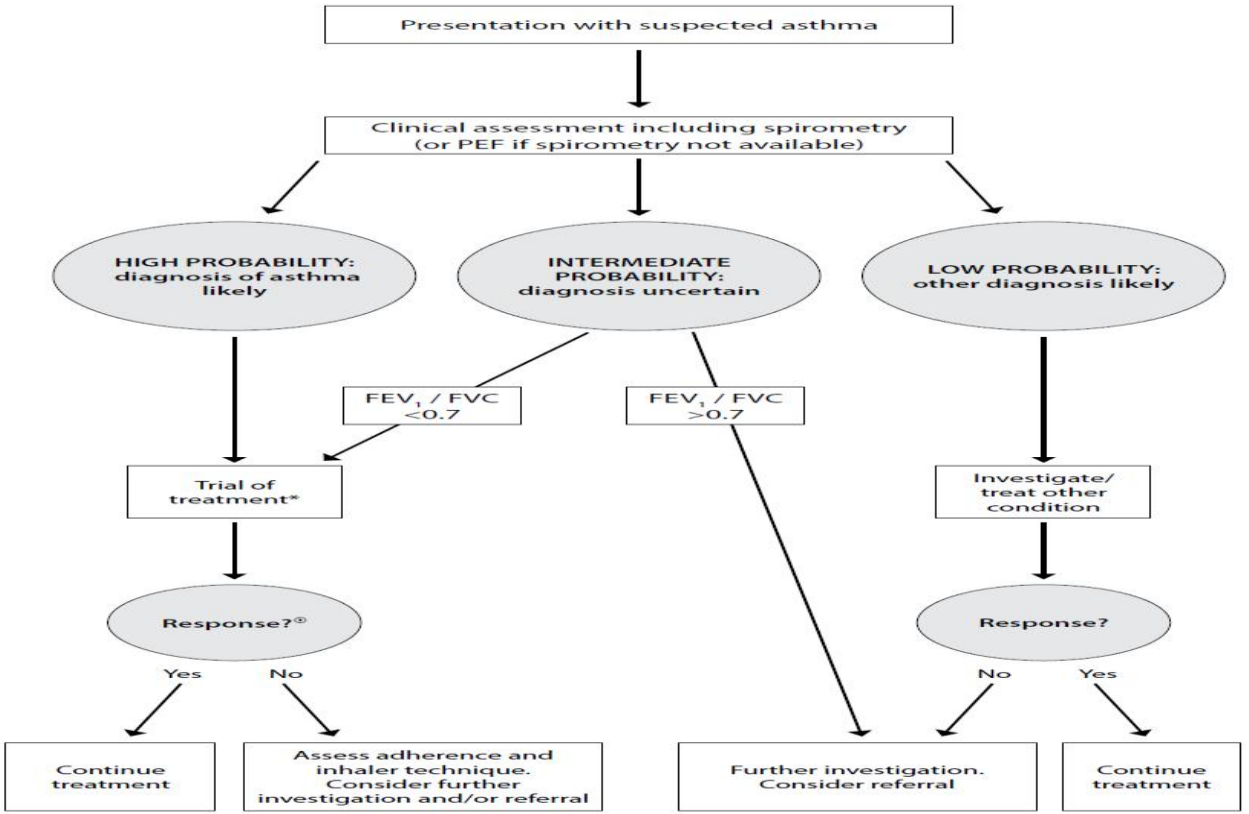
Diagnosis

Features that lower the probability of asthma

- Prominent dizziness, light-headedness, peripheral tingling
- Chronic productive cough in the absence of wheeze or breathlessness
- Repeatedly normal physical examination of chest when symptomatic
- Voice disturbance
- Symptoms with colds only
- Significant smoking history (ie > 20 pack-years)
- Cardiac disease
- Normal PEF or spirometry when symptomatic

Diagnosis

Figure 2: Presentation with suspected asthma in adults



Differential diagnosis

Category	Examples
Diseases causing recurrent episodic dyspnea	Chronic obstructive pulmonary disease, coronary artery disease, congestive heart failure, pulmonary emboli, recurrent gastroesophageal reflux with aspiration, recurrent anaphylaxis, systemic mastocytosis, carcinoid syndrome
Common diseases causing cough	Rhinitis, sinusitis, otitis, bronchitis (chronic or postviral), bronchiectasis, cystic fibrosis, pneumonia, diffuse pulmonary fibrosis
Common diseases causing airflow obstruction	Chronic obstructive bronchitis and emphysema, bronchiolitis obliterans, cystic fibrosis, organic or functional laryngeal narrowing, extrinsic or intrinsic narrowing of trachea or major bronchus.

Management of asthma

General Principles

- Goals Of Asthma Management:
  - ✓ risk reduction.

Risk of mortality,exacerbations,persistent airflow limitation, medications side effects

  - ✓ symptom control, maintain normal activity levels

"The patient's own goals regarding their asthma and its treatment should also be identified"

- Partnership & communication skills.
- Health literacy

Asthma drug classification

CONTROLLERS		RELIEVERS
Anti-inflammatory action to prevent asthma attacks	Sustained bronchodilator action but weak or unproven anti-inflamatory effect	For quick relief of symptoms and use in acute attacks as PRN dosage only
Inhaled corticosteroids 1. Beclomethasone 2. Budesonide 3. Fluticasone 4. Ciclesonide	**Long-acting beta-agonists** 1. Salmeterol 2. Formoterol	**Short-acting beta-agonists** 1. Salbutamol 2. Fenoterol 3. Terbutaline
Leukotriene modifiers 1. Montelukast 2. Zafirlkast **Oral corticosteroids** 1. Prednisone 2. Prednisolone 3. Methylprednisone 4. Methylprednisolone	**Sustained-release theophylline preparations**	**Anti-cholinergenics** Ipratropium bromide

Asthma drug classification

What Are Relievers?

Rescue medications to

- _ treat acute bronchospasm
- _ Quick relief of symptoms
- _ Used during acute attacks
- -_Action usually lasts 4-6 hrs

What are Controllers?

Control/treat chronic inflammation

Prevent future attacks

Long term control

Prevent airway remodeling

GINA 2022:
stepwise treatment of asthma
in adults and adolescents

STEP 1,step 2

- For patients with mild intermittent asthma (symptoms less than twice amonth and no risks of exacerbations)or for step-down of step 2
- From 2019, for safety, GINA no longer recommends starting with SABA only treatment
- Controller Options
  - Preferred' controller options
    - **As-needed low dose ICS-formoterol**
  - Other controller option
    - **Low dose ICS taken whenever SABA is taken**

STEP 1 AND step 2… (continued

- Reliever Options
  - Preferred reliever Options
    - **As-needed low dose ICS-formoterol**
  - Other reliever option
    - **As-needed short-acting β2 -agonist (SABA)**

Adults & adolescents 12+ years

Personalized asthma management
Assess, Adjust, Review
for individual patient needs

Confirmation of diagnosis if necessary
Symptom control & modifiable risk factors (see Box 2-2B(
Comorbidities
Inhaler technique & adherence
Patient preferences and goals

Symptoms
Exacerbations
Side-effects
Lung function
Patient satisfaction

Treatment of modifiable risk factors and comorbidities
Non-pharmacological strategies
Asthma medications (adjust down/up between tracks)

CONTROLLER and **PREFERRED RELIEVER**
)Track 1). Using ICS-formoterol as reliever reduces the risk of exacerbations compared with using a SABA reliever

STEPS 1 – 2	STEP 3	STEP 4	STEP 5
As-needed low dose ICS-formoterol	Low dose maintenance ICS-formoterol	Medium dose maintenance ICS-formoterol	Add-on LAMA Refer for assessment of phenotype. Consider high dose maintenance ICS-formoterol، ±anti-IgE, anti-IL5/5R, anti-IL4R, anti-TSLP

RELIEVER: As-needed low-dose ICS-formoterol

CONTROLLER and **ALTERNATIVE RELIEVER**
)Track 2). Before considering a regimen with SABA reliever, check if the patient is likely to be adherent with daily controller

STEP 1	STEP 2	STEP 3	Medium/high dose maintenance ICS-LABA	Refer for assessment of phenotype. Consider high dose maintenance ICS-LABA, ± anti-IgE، anti-IL5/5R, anti-IL4R, anti-TSLP
Take ICS whenever SABA taken	Low dose maintenance ICS	Low dose maintenance ICS-LABA		

RELIEVER: As-needed short-acting beta$_2$-agonist

Other controller options for either track (limited indications, or less evidence for efficacy or safety)	*Low dose ICS whenever SABA taken, or daily LTRA, or add HDM SLIT*	*Medium dose ICS, or add LTRA, or add HDM SLIT*	*Add LAMA or LTRA or HDM SLIT, or switch to high dose ICS*	*Add azithromycin (adults) or LTRA. As last resort consider adding low dose OCS but consider side-effects*

Adults & adolescents 12+ years

Personalized asthma management
Assess, Adjust, Review
for individual patient needs

Confirmation of diagnosis if necessary
Symptom control & modifiable risk factors (see Box 2-2B(
Comorbidities
Inhaler technique & adherence
Patient preferences and goals

Symptoms
Exacerbations
Side-effects
Lung function
Patient satisfaction

Treatment of modifiable risk factors and comorbidities
Non-pharmacological strategies
Asthma medications (adjust down/up/between tracks)
Education & skills training

CONTROLLER and **PREFERRED RELIEVER**
)Track 1). Using ICS-formoterol

STEPS 1 – 2
As-needed low dose ICS-formoterol

STEP 3
Low dose maintenance ICS-formoterol

STEP 4
Medium dose maintenance ICS-formoterol

STEP 5
Add-on LAMA
Refer for assessment of phenotype. Consider high dose maintenance ICS-formoterol, ±anti-IgE, anti-IL5/5R,

CONTROLLER and
ALTERNATIVE RELIEVER
)Track 2). Before considering a regimen with SABA reliever, check if the patient is likely to be adherent with daily controller

STEP 1
Take ICS whenever SABA taken

STEP 2
Low dose maintenance ICS

STEP 3
Low dose maintenance ICS-LABA

STEP 4
Medium/high dose maintenance ICS-LABA

STEP 5
Add-on LAMA
Refer for assessment of phenotype. Consider high dose maintenance ICS-LABA, ± anti-IgE, anti-IL5/5R, anti-IL4R, anti-TSLP

RELIEVER: As-needed short-acting beta$_2$-agonist

Other controller options for either track (limited indications, or less evidence for efficacy or

Low dose ICS whenever SABA taken, or daily LTRA, or add HDM SLIT

Medium dose ICS, or add LTRA, or add HDM SLIT

Add LAMA or LTRA or HDM SLIT, or switch to high dose ICS

Add azithromycin (adults) or LTRA. As last resort consider adding low dose OCS but consider side-

Adults & adolescents 12+ years

Personalized asthma management
Assess, Adjust, Review
for individual patient needs

Confirmation of diagnosis if necessary
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Patient preferences and goals

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Exacerbations
Side-effects
Lung function
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Non-pharmacological strategies
Asthma medications (adjust down/up/between tracks)
Education & skills training

CONTROLLER and **PREFERRED RELIEVER**
)Track 1). Using ICS-formoterol as reliever reduces the risk of exacerbations compared with using a SABA reliever

STEPS 1 – 2
As-needed low dose ICS-formoterol

STEP 3
Low dose maintenance ICS-formoterol

STEP 4
Medium dose maintenance ICS-formoterol

STEP 5
Add-on LAMA
Refer for assessment of phenotype. Consider high dose maintenance ICS-formoterol‹ ±anti-IgE, anti-IL5/5R, anti-IL4R, anti-TSLP

RELIEVER: As-needed low-dose ICS-formoterol

See GINA severe asthma guide

CONTROLLER and **ALTERNATIVE RELIEVER**

STEP 1

STEP 2
Low dose

STEP 3
Low dose maintenance ICS-LABA

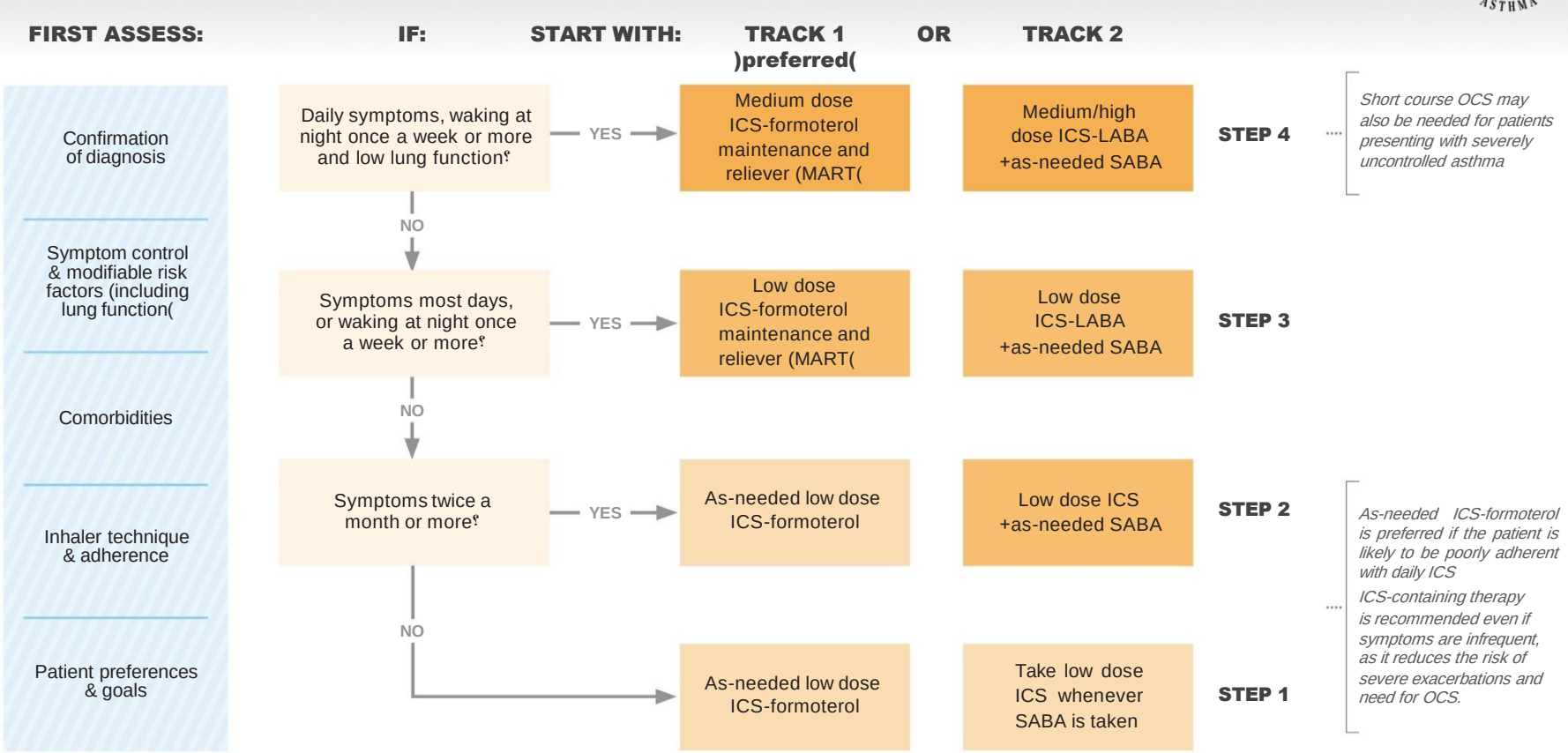
STEP 4
Medium/high dose maintenance ICS-LABA

STEP 5
Add-on LAMA
Refer for assessment of phenotype. Consider high dose maintenance ICS-LABA, ± anti-IgE‹

Other controller options for either track (limited indications, or less evidence for efficacy or safety(		*Low dose ICS whenever SABA taken, or daily LTRA, or add HDM SLIT*	*Medium dose ICS, or add LTRA, or add HDM SLIT*	*Add LAMA or LTRA or HDM SLIT, or switch to high dose ICS*	*Add azithromycin (adults) or LTRA. As last resort consider adding low dose OCS but consider side-effects*

STARTING TREATMENT

in adults and adolescents 12+ years with a diagnosis of asthma



STEP 1 ,STEP 2 … (continued)

- Another controller options

- **leukotriene receptor antagonist (less effective for exacerbations**

STEP 3

- *If troublesome symptoms most of days ,waking due to asthma once weekly or more particularly if risk factors exist*
  - *Add-on therapy*
  - Controller Options
  - preferred' controller option
    - **low dose ICS-formoterol maintenance and reliever therapy(MART)**

STEP 3

- Other controller options:TRACK2
  - Low dose ICS-LABA

- Other alternative controller options :
  - **Medium dose ICS**
  - **Add leukotriene receptor antagonist (less effective for exacerbations)**
  - **Consider adding SLIT(sublingual allergen immunotherapy),**

STEP 3

- Reliever Options
  - Preferred reliever Options
    - **As-needed low dose ICS-formoterol**
  - Other reliever option
    - **As-needed short-acting β2 -agonist (SABA)**

STEP 4

- *Persistent poor control on step 3:*

- Controller Options:
  - preferred' controller option(TRACK 1)
    - **medium dose ICS-formoterol as maintenance and reliever therapy.**

  Alternative controller options (TRACK2)
    - **Medium and high dose ICS-LABA maintenance plus as needed SABA**

STEP 4

- Other controller Options:

- **Add LAMA**
- **Add leukotriene receptor antagonist (less effective for exacerbations)**
- **Switch to high dose ICS**
- **Consider adding SLIT(sublingual allergen immunotherapy),**

STEP 4

- Assess for contributory factors
- Check the inhaler technique
- Check adherence and understanding of medication
- Consider aggravation by:

– Exposure to triggers/allergens at home or work

– Co-morbid conditions: GI reflux,rhinitis/sinusitis, cardiac problem

– Medications: Beta-blockers, NSAIDs, Aspirin

STEP 5

Treatment optimization.

- preferred' controller option
  - **High dose ICS-Formetrol**
  - **High dose ICS-LABA (TRACK 2)**

- phenotypic investigations
- add-on treatments:
  - Tiotropium by mist inhaler for patients ≥6 years
  - For severe allergic asthma, anti-ige (SC omalizumab, ≥6 years);
  - For severe eosinophilic asthma, anti-il5 (SC mepolizumab, ≥6 years,or IVreslizumab, ≥18 years) or anti-il5r (SC benralizumab, ≥12 years) or anti-il4r (scdupilumab, ≥12 years
  - Bronchial thromboplasty

Other controller options:

low dose OCS(short course)

Other treatments

- Allergen immunotherapy
- Vit D in pt with deficient level
- Vaccinations

  Annual influenza vaccine for moderate and severe asthma.

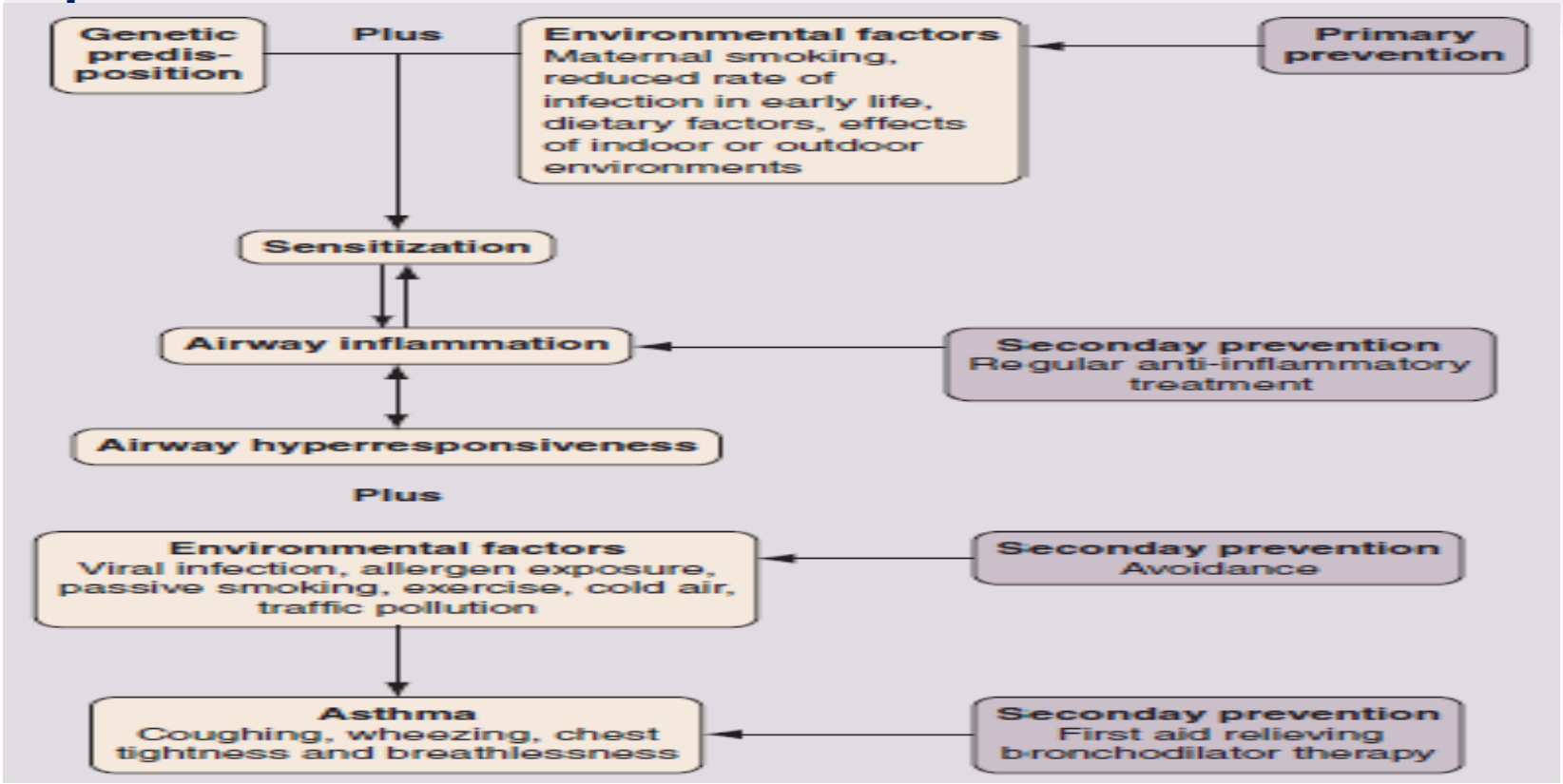
Treat comorbid conditions.

- Consider allergic bronchopulmonary aspergillosis, gastroesophageal reflux, obesity, obstructive sleep apnea, rhinitis and sinusitis, and stress or depression. Treatment of these conditions may improve asthma control

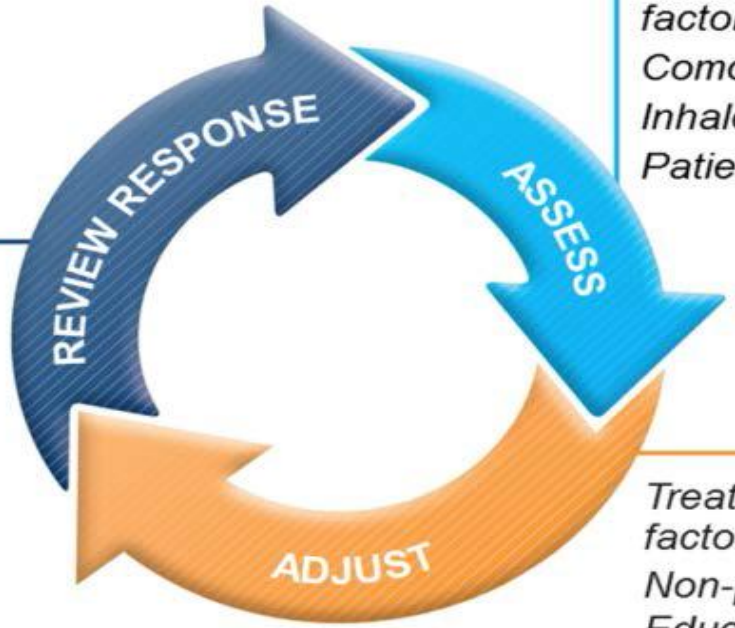
Non-pharmacological management

- Smoking cessation
- Physical activity
- Avoidance of occupational exposure
- Avoidance of medications that make asthma worse (NSAIDS,aspirin if allergic,non selective B blockers,
- Healthy diet
- Avoidance of indoor allergen : but may be relevant in atopic patients, when removing or reducing exposure to relevant antigens, such as a pet, may effect improvement. House dust mite exposure may be minimised by replacing carpets with floorboards and using mite impermeable bedding
- Avoidance of indoor allergen
- Breathing exercises
- Weight reduction in obese pt
- Dealing with stress conditions

Levels of prevention



Asthma Management Cycle



Confirmation of diagnosis if necessary
Symptom control & modifiable risk factors (including lung function)
Comorbidities
Inhaler technique & adherence
Patient (and parent) goals

Symptoms
Exacerbations
Side-effects
Lung function
Patient (and parent) satisfaction

Treatment of modifiable risk factors & comorbidities
Non-pharmacological strategies
Education & skills training
Asthma medications

REVIEWING RESPONSE AND ADJUSTING TREATMENT

How often should patients with asthma be reviewed?

- Patients should preferably be seen 1–3 months after starting treatment and every 3–12 months after that, but in pregnancy, asthma should be reviewed every 4–6 weeks. After an exacerbation, a review visit within 1 week should be scheduled.

- The frequency of review depends on the patient's initial level of symptom control, their risk factors, their response to initial treatment, and their ability and willingness to engage in self-management with an action plan

Stepping up asthma treatment

- Sustained step-up (for at least 2–3 months):

  ✓If symptoms and/or exacerbations persist despite 2–3 months of controller treatment, assess the following common issues before considering a step-up.

  - Incorrect inhaler technique
  - Poor adherence
  - Modifiable risk factors, e.g. smoking
  - Are symptoms due to comorbid conditions, e.g. allergic rhinitis

- Short-term step-up (for 1–2 weeks).
- Day-to-day adjustment

Stepping down asthma treatment

- Consider stepping down treatment once good asthma control has been achieved and maintained for 3 months.
- Appropriate time.
- Document baseline status.
- Reduce the ICS dose by 25–50% at 2–3 month intervals

Stepping down asthma treatment... (continued

- If asthma is well-controlled on low dose ICS or LTRA, as-needed low dose ics-formoterol is a step-down option.

- Do not completely stop ICS.

- Arrange for follow-up appointments

Treatment

Therapy to avoid!

- **Sedatives & hypnotics**
- **Cough syrups**
- **PROLONGED Anti-histamines**
- **Immunosuppressive drugs**
- **Immunotherapy**
- **Maintenance oral prednisone >10mg/day**

Exacerbations of asthma

Exacerbations of asthma

- Definition :increased symptoms, deterioration in lung function, and an increase in airway inflammation from the patient usual status.
- Death is fortunately rare but a considerable number of deaths occur in young people and many are preventable.
- Precipitating factors :

  - viral infection :most common
  - bacterial infection
  - moulds (*Alternaria* and *Cladosporium*),
  - pollens (particularly following thunderstorms) and
  - air pollution are also implicated
  -drugs

Lessons from asthma deaths and near-fatal asthma

- Most deaths occurred before admission to hospital.
- Most patients who died of asthma had chronically severe asthma.
- Many of the deaths occurred in patients who had received inadequate treatment with ICS or steroid tablets and/or inadequate objective monitoring of their asthma.
- Deaths continue to be reported following inappropriate prescription of β-blockers and non-steroidal anti-inflammatory drugs (NSAIDs).
- Behavioural and adverse psychosocial factors were recorded in the majority of patients who died of asthma.

MANAGEMENT OF EXACERBATIONS

Initial evaluation

- A brief history and focused examination should be conducted concurrently with prompt initiation of therapy (SABA and oxygen).
- History :onset,risk factors,severity of symptoms ,current medications ,risks factors of asthma related death .
- Examination :signs of severity ,vital signs, tachypnoea, tachycardia, silent chest, cyanosis, accessory muscle use, altered consciousness,signs of complications(pneumothorax ,pneumonia) ,signs of alternative dx (HF,foreign body ,PE).
- objective measurments

  -pulse oxymetry ,ABG if needed

  -PEF

CXR : if pneumothorax is suspected ,pneumonia

MANAGEMENT OF EXACERBATIONS

- **Patients at risk of developing near-fatal or fatal asthma**
- A combination of severe asthma recognised by one or more of:
- previous near-fatal asthma, eg previous ventilation or respiratory acidosis
- previous admission for asthma especially if in the last year
- requiring three or more classes of asthma medication
- heavy use of β2 agonist
- repeated attendances at ED for asthma care especially if in the last year
- AND adverse behavioural or psychosocial features recognised by one or more of non-adherence with treatment or monitoring, failure to attend appointments

fewer GP contacts, frequent home visits, self discharge from hospital, psychosis, depression, other psychiatric illness or deliberate self harm, current or recent major tranquilliser use, denial , alcohol or drug abuse, obesity, learning difficulties

MANAGEMENT OF EXACERBATIONS

Start treatment

- *Oxygen.* High concentrations (humidified if possible) should be administered to maintain the oxygen saturation above 92% .Failure to achieve appropriate oxygenation is an indication for assisted ventilation.
- *High doses of inhaled bronchodilators. Repeated doses of* Short-acting β2-agonists are the agent of choice. In hospital, they are most conveniently given via a nebuliser driven
- by oxygen, but delivery of multiple doses of salbutamol via a metered-dose inhaler through a spacer device provides equivalent bronchodilatation and can be used in primary care. Ipratropium bromide provides further bronchodilator therapy and should be added to salbutamol in acute severe or life-threatening attacks.
- • *Systemic corticosteroids*
- Prednisolone 40–50 mg daily or parenteral hydrocortisone 400 mg daily (100
- mg six-hourly) are as effective as higher doses, intramuscular methylprednisolone 160 mg as an alternative to a course of oral prednisolone.

MANAGEMENT OF EXACERBATIONS

- **REVIEWING RESPONSE**
- 1.Monitor patients closely and frequently during treatment, and titrate treatment according to response.
- Transfer to higher level care if worsening or failing to respond. Decide on need for hospitalization based on clinical status, symptoms and lung function, response to treatment, recent and past history of exacerbations, and ability to manage at home.
- **Arrange immediate transfer** to an acute care facility if there are signs of severe exacerbation, or to intensive care if the patient is drowsy, confused, or has a silent chest. For these patients, immediately give inhaled SABA, inhaled ipratropium bromide, oxygen and systemic corticosteroids.

MANAGEMENT OF EXACERBATIONS

19.25 Immediate assessment of acute severe asthma

Acute severe asthma

- PEF 33–50% predicted (< 200 L/min)
- Respiratory rate ≥ 25 breaths/min
- Heart rate ≥ 110 beats/min
- Inability to complete sentences in 1 breath

Life-threatening features

- PEF < 33% predicted (< 100 L/min)
- *Sp*O_2 < 92% or *Pa*O_2 < 8 kPa (60 mmHg) (especially if being treated with oxygen)
- Normal or raised *Pa*CO_2
- Silent chest
- Cyanosis
- Feeble respiratory effort
- Bradycardia or arrhythmias
- Hypotension
- Exhaustion
- Confusion
- Coma

Near-fatal asthma

- Raised *Pa*CO_2 and/or requiring mechanical ventilation with raised inflation pressures

MANAGEMENT OF EXACERBATIONS

Admission criteria

- Admit patients with any feature of a life-threatening or near-fatal asthma attack.
- Admit patients with any feature of a severe asthma attack persisting after initial treatment.

MANAGEMENT OF EXACERBATIONS

- Patients whose peak flow is greater than 75% best or predicted one hour after initial treatment may be discharged from ED unless they meet any of the following criteria, when admission may be appropriate:
- still have significant symptoms
- Risk of asthma death (poorly controlled ,not on inhaled steroids,prevoius frequent exacerbations)

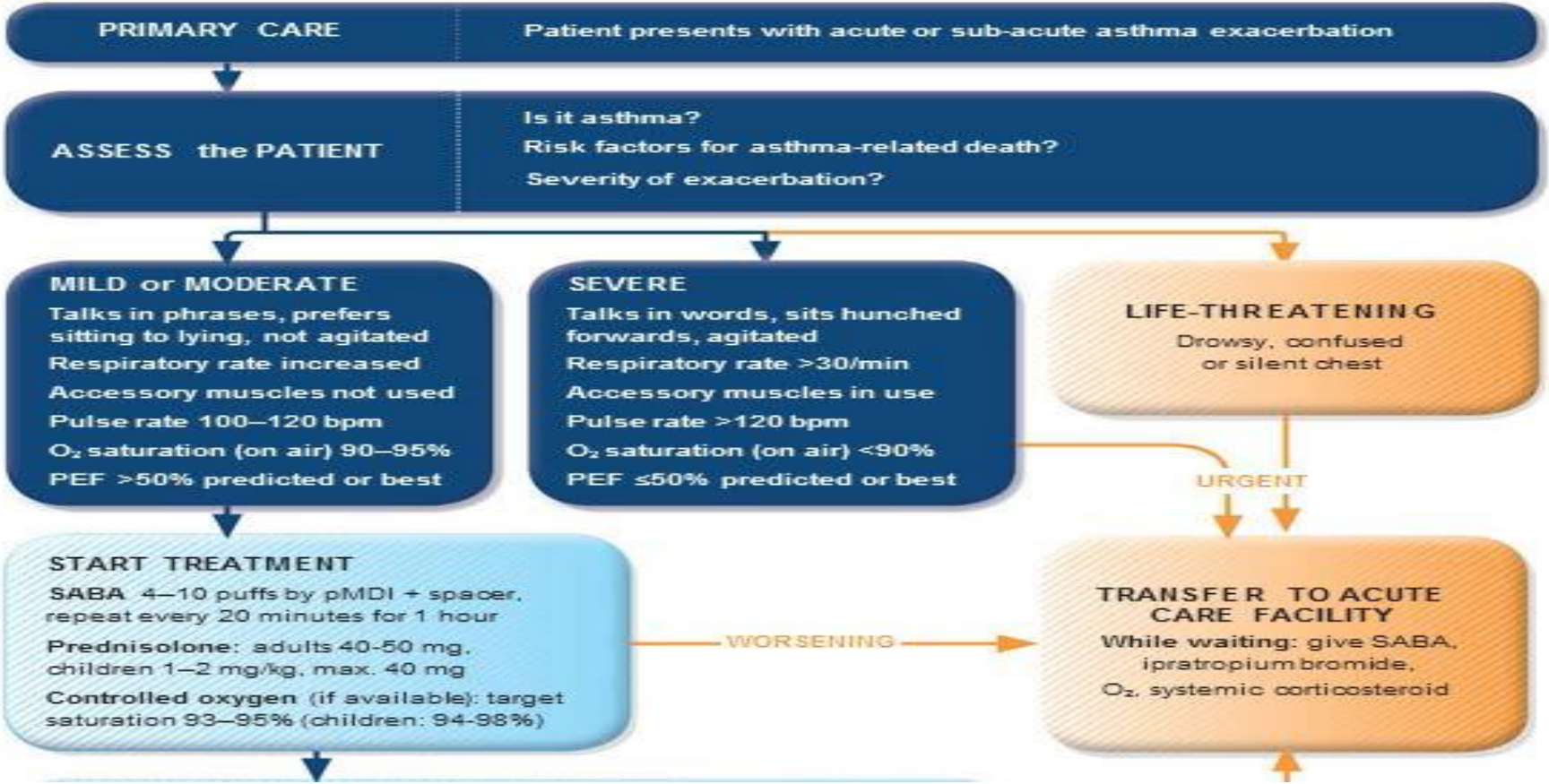
concerns about adherence

- living alone/socially isolated psychological problems
- physical disability or learning difficulties
- previous near-fatal asthma attack
- asthma attack despite adequate dose steroid tablets pre-presentation
- presentation at night
- pregnancy.

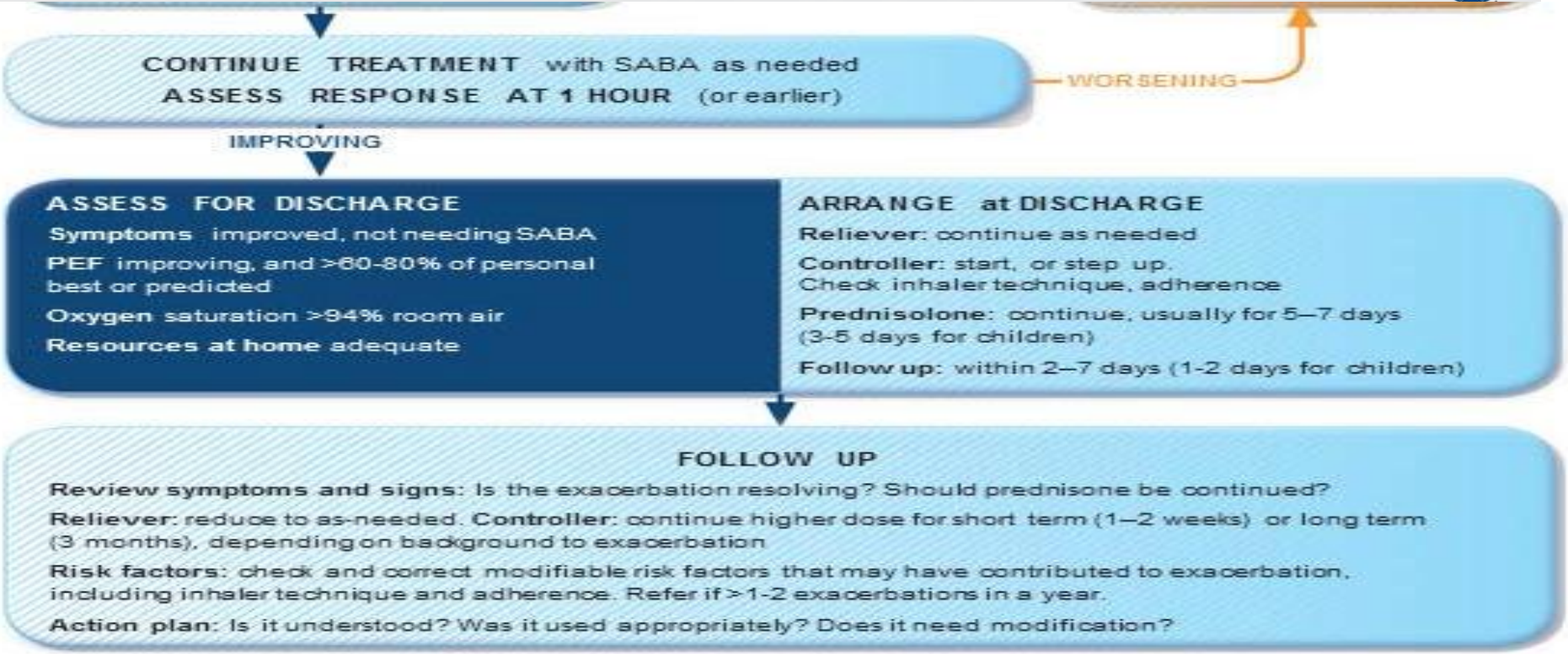
MANAGEMENT OF EXACERBATIONS

- **Arrange immediate transfer** to an acute care facility if there are signs of severe exacerbation, or to intensive care if the patient is drowsy, confused, or has a silent chest. For these patients, immediately give inhaled SABA, inhaled ipratropium bromide, oxygen and systemic corticosteroids

MANAGEMENT OF EXACERBATIONS



MANAGEMENT OF EXACERBATIONS



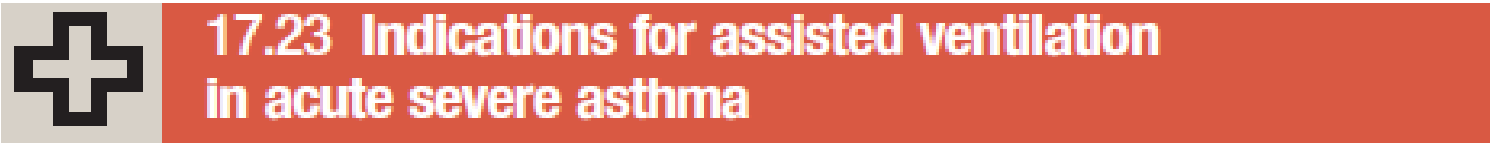
MANAGEMENT OF EXACERBATIONS

For severe exacerbations,

- Add ipratropium bromide, and consider giving SABA by nebulizer.
- In acute care facilities, intravenous magnesium sulfate may be considered for inadequate response to intensive initial treatment,or in patients whose presenting PEF is below 30% predicted. Magnesium sulphate is given as1.2–2 g IV infusion over 20 minutes,may reapeted .
- Other treatments :
- Intra venous Aminophylline:no additional benefits, not prefered.
- Helium oxygen therapy .
- second line medications: epinephrine and ketamine.

MANAGEMENT OF EXACERBATIONS

- endotracheal intubation and intermittent positive pressure ventilation (IPPV)



17.23 Indications for assisted ventilation in acute severe asthma

- Coma
- Respiratory arrest
- Deterioration of arterial blood gas tensions despite optimal therapy:
  - $PaO_2 < 8$ kPa (60 mmHg) and falling
  - $PaCO_2 > 6$ kPa (45 mmHg) and rising
  - pH low and falling (H^+ high and rising)
- Exhaustion, delirium, drowsiness

MANAGEMENT OF EXACERBATIONS

Two rescue options:

- Inhalational agents (isoflurane or sevoflurane)
- ECMO

Non specific treatment :

-iv fluid only in dehydrated pt

-Antibiotics:not routinly recommended ,only if strong evidence of infection(fever,purulent sputum, or radiological evidence of Pneumonia.

SEVERE ASTHMA

OXYGEN
ALBUTEROL
IPRATROPIUM BROMIDE
STEROIDS

MAGNESIUM
EPINEPRHINE

KETAMINE
BIPAP

INHALATIONAL ANESTHESIA
ECMO

REVIEWING RESPONSE

1.Monitor patients closely and frequently during treatment, and titrate treatment according to response.

- PEF should be recorded every 15–30 minutes and then every 4–6 hours. Pulse oximetry should ensure that *Sa*O2 remains above 92%, but repeat arterial blood gases are necessary if the initial *Pa*CO2 measurements were normal or raised, the *Pa*O2 was below 8 kPa (60 mmHg) or the patient deteriorates

Transfer to higher level care if worsening or failing to respond. **Decide on need for hospitalization** based on clinical status, symptoms and lung function, response to treatment, recent and past history of exacerbations, and ability to manage at home

HOSPITAL DISCHARGE AND FOLLOW UP

- Criteria for discharge
- -clinically stable (can sleep without sob ,can walk through floor without sob)
- -vitally stable
- - (nebulised therapy should have been discontinued for at least 24 hours) be on reducing amounts of β2 agonist (preferably no more than four hourly)
- PEF should have reached 75% of predicted or personal best.
- Normal ABG
- on medical therapy they can continue safely at home.

MANAGEMENT OF EXACERBATIONS

Before discharge, arrange ongoing treatment. For most patients, prescribe regular controller therapy (or increase current dose) to reduce the risk of further exacerbations. Continue increased controller doses for 2–4 weeks, and reduce reliever to as-needed dosing. Check inhaler technique and adherence.

Provide an interim written asthma action plan.

Arrange early follow-up after any exacerbation, within 2–7 days (for children, within 1-2 working days). Consider early referral for specialist advice after hospitalization, or for patients with repeated ED presentations

FOLLOW-UP AFTER AN EXACERBATION

Exacerbations often represent failures in chronic asthma care, and they provide opportunities to review the patient's asthma management.

All patients must be followed up regularly by a health care provider until symptoms and lung function return to normal.

Take the opportunity to review:

a) The patient's understanding of the cause of the exacerbation

b) Modifiable risk factors for exacerbations, e.g. smoking

c) Understanding of purposes of medications, and inhaler technique skills.

d)Adherence with ICS and OCS may fall rapidly after discharge.

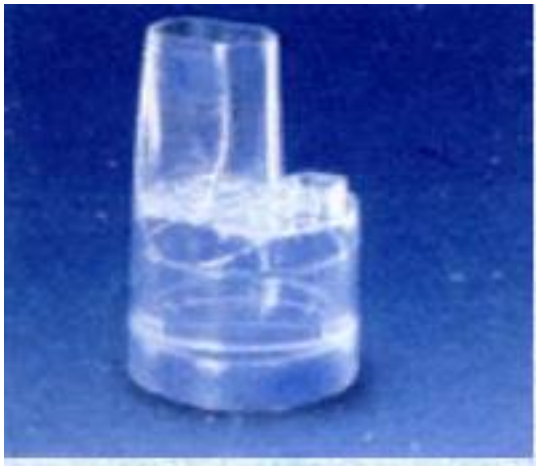
e) Review and revise written asthma action plan

MANAGEMENT OF EXACERBATIONS

- Comprehensive post-discharge programs that include optimal controller management, inhaler technique, self-monitoring, written asthma action plan and regular review are cost-effective and are associated with significant improvement in asthma outcomes.
- Referral for expert advice should be considered for patients who have been hospitalized for asthma, or who re-present for acute asthma care. Patients who have had >1-2 exacerbations/year despite Step 4-5 treatment should be referred.

Estimated Comparative Daily Dosages for Adults of Inhaled Corticosteroids

Drug	Low Dose Step 2	Medium Dose Step 3	High Dose Step 4
Beclomethasone	1-3 puffs 80 - 240 mcg	3-6 puffs 240 - 480 mcg	>6 puffs > 480 mcg
Budesonide DPI	1-3 puffs 200 – 600 mcg	3-6 puffs 600 – 1,200 mcg	> 6 puffs > 600 mcg
Flunisolide	2-4 puffs 500–1,000 mcg	4-8 puffs 1,000–2,000 mcg	> 8 puffs > 2,000 mcg
Fluticasone	2-6 puffs (44) 88-264 mcg	2-6 puffs (110) 264-660 mcg	> 6 puffs (110) > 660 mcg
Triamcinolone	4-10 puffs 400-1,000 mcg	10-20 puffs 1,000–2,000 mcg	> 20 puff > 2,000 mcg



Remember

- Clinical manifestations of bronchial asthma are unpredictable and variable
- “Silent chest” is ominous sign of impending respiratory failure
- Diagnosis of bronchial asthma is a clinical one
- GINA no longer recommends starting with SABA only treatment in step 1
- Assess the contributory factors before considering a step-up
- Avoid maintenance oral prednisone >10mg/day
- Deaths continue to be reported following inappropriate prescription of β-blockers and non-steroidal anti-inflammatory drugs (NSAIDs)
- Remember features of acute severe asthma and that of a life-threatening or near-fatal asthma attack.
- Remember patients at risk of developing near-fatal or fatal asthma

Recommendations and home activity

- Review one patient plan of treatment
- Distinguish bronchial asthma from cardiogenic asthma

Thank you